

# TECHNICAL MEMORANDUM

Date: March 29, 2018  
To: The Chemours Company FC, LLC  
From: Tracy Ovbeey  
Subject: Nafion® VE-South Investigation  
Fayetteville Works Facility  
Fayetteville, North Carolina

## INTRODUCTION

Parsons has prepared this *Nafion® VE-South Investigation Technical Memorandum* on behalf of the Chemours Fayetteville Works facility (Site) located in Fayetteville, North Carolina (Figure 1). Sampling was conducted in the Nafion® Vinyl Ethers (VE)-South area of the Site on February 2018 as part of on-going site investigation activities. This document presents the results of the investigation, which included the following sampling efforts:

- Collection of surface wipe samples from 23 locations
- Collection of 44 surface soil samples
- Collection of 20 ditch soil samples from the non-contact cooling water channel

Samples collected during this investigation were analyzed for the target compound hexafluoropropylene oxide dimer acid (HFPO-DA; CAS number 13252-13-6). The objective of this sampling investigation was to assess the presence of HFPO-DA in the area that may have resulted from an October 2017 HFPO-DA release. Additional information about each sampling effort is presented below.

## SURFACE WIPE SAMPLING

Surface wipe samples were collected from 23 locations in the Nafion® VE-South area (as shown on Figure 2). The samples were collected from the open or available surface area of buildings, pipes, and other structures that were pre-selected by Chemours and Parsons personnel as having potential residue from the October 2017 release. The wipe sampling event began on February 6, 2018 and was completed on February 13<sup>th</sup>, 2018. Samples collected during this investigation were submitted to TestAmerica Laboratories for analysis of HFPO-DA.

## SURFACE SOIL SAMPLING

Surface soil samples were collected at 44 locations throughout the Nafion® VE-South area (as shown on Figure 3). The surface soil sampling investigation event began on February 7, 2018 and was completed on February 21, 2018. Samples collected during this investigation were submitted to TestAmerica Laboratories for analysis of HFPO-DA.

## DITCH SOIL SAMPLING

Shallow ditch soil samples were collected from 16 locations along the bank of the non-contact cooling water channel (Figure 4). The samples were collected on February 8 and 9, 2018 and were submitted to TestAmerica Laboratories for analysis of HFPO-DA.

by the Synthetic Precipitation Leaching Procedure (SPLP). Two additional soil samples were collected at two of the primary locations and were analyzed for soil moisture only.

### ***SAMPLING AND ANALYTICAL METHODOLOGY***

This section presents the methods and procedures that were used during the investigation.

#### ***Surface Wipe Sampling Procedure***

The following procedure was followed during surface wipe sampling:

1. Each wipe sample location surface area was measured and marked out (samples were collected in open areas of various size).
2. A clean sampling pad was selected and placed in a container with Methanol/NH<sub>4</sub>OH until saturated. Once saturated, it was removed with laboratory provided forceps.
3. The sampling gauze pad was wiped over the designated sample area with straight, even, slightly overlapping strokes. Using a second, clean pad, the wiping direction was changed and the pattern was repeated until the team member was confident that all the surface contaminant had been removed. All pads used to sample a single location were placed into one sample container as a composite sample. A minimum of three pads were collected from each sampling location.
4. The sample location was recorded and a chain of custody and fieldbook documentation were prepared for the collected samples.
5. Each wipe location was also photographed during the sampling effort.

A detailed procedure for wipe sample collection is included in Attachment 1. The procedure was prepared by TestAmerica Laboratories for Chemours.

#### ***Surface Soil Sampling Procedure***

Prior to collection, the predetermined sample locations were identified and cleared for underground obstructions and utilities. The soil sample was then collected using an AMS soil core sampler equipped with a new stainless-steel liner. The liner was placed into the core barrel, which was then attached to the slide hammer. The core barrel was driven into the ground using the slide hammer until the top of the core barrel was level with ground surface. The core barrel was removed from the ground using the slide hammer, and the stainless-steel liner was removed from the core barrel. The ends of the liner were covered with Saran Wrap® and capped with plastic end caps. The sample liner was then labeled, placed in a Ziploc® bag, and then put into a sample cooler. Field staff noted the sample location in the field book with reference points (when possible) and collected the coordinates using ARC collector.

#### ***Ditch Soil Sampling Procedure***

The shallow ditch soil samples were collected in fine-grained sediments (not gravel) immediately next to the ditch. The samples were collected above the ditch liner and within three feet of the ditch water.

At each sample location, the surface gravel was cleared off of the sampling location. A hand auger was then used to dig down not deeper than two feet, to either the top of the liner or, if no liner was present, to the top of the first clay layer. The soil sample was

collected from the six inches above the first low permeability layer (e.g, the clay or the liner). The lithology was recorded and photographed. Care was taken to ensure soil spoils did not enter the ditch or ditch water.

At two locations along the ditch, samples were collected from:

- three feet from the water edge (analyzed for moisture content only)
- two feet from the water edge (analyzed for moisture content only)
- one foot from the water edge (analyzed for HFPO-DA and moisture content)

The moisture content analysis samples were collected from the soil that was two to four inches above the liner/clay. The HFPO-DA analysis samples were collected from the soil that was six inches above the liner/clay.

### ***Preservation and Handling of Samples***

Immediately upon collection, each sample was placed into an insulated sample cooler for shipment to the laboratory. Wipe samples were shipped without wet ice preservation. Surface soil samples and ditch soil samples were preserved with wet ice, which was placed in the sample cooler within heavy-duty plastic bags. Samples were maintained at a cool temperature (optimum  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ) from the time of collection until the coolers arrived at the laboratory (if required).

Prior to shipment of the samples to the laboratory, a chain-of-custody form was completed by the field sample custodian. Sample locations, sample identification numbers, description of samples, number of samples collected, and specific laboratory analyses to be run on each sample were recorded on the chain-of-custody form.

### ***Quality Control Checks***

Associated quality control samples collected and analyzed for the project included equipment blanks, field duplicates, and matrix spikes and lab replicates collected at a frequency of one per 20 samples, and field blanks, duplicate samples were collected daily or once per 20 samples.

### ***Laboratory Analysis***

Wipe samples were submitted to TestAmerica Laboratory in Knoxville, TN for extraction before being submitted to TestAmerica-Denver, Arvada, Colorado for analysis of HFPO-DA using method DV-LC-0012, Revision 14. Surface soil and ditch soil samples were submitted directly to TestAmerica-Denver, Arvada, Colorado for analysis of HFPO-DA using method DV-LC-0012, Revision 14. The laboratory reported the HFPO-DA results to a reporting limit (RL) which was based on the low concentration or concentration equivalent calibration standard. Reported concentrations were not corrected for contaminants detected in associated method and field blanks. Deliverables included a narrative and appropriate laboratory raw data and QC summary forms.

**RESULTS**

The results of the Nafion® VE-South investigation sampling efforts are summarized below.

***Wipe Sample Results***

Wipe samples were collected from 23 locations within the Nafion®-VE South area. Detections of HFPO-DA are shown in micrograms per square inch ( $\mu\text{g}/\text{In}^2$ ) and ranged from  $4.24\text{E-}04$   $\mu\text{g}/\text{In}^2$  to  $6.93\text{E-}01$   $\mu\text{g}/\text{In}^2$ . Results are listed in Table 1.

***Surface Soil Sample Results***

Surface soil samples were collected from a total of 44 locations. Results ranged from less than 1.3  $\mu\text{g}/\text{kg}$  to 32,000  $\mu\text{g}/\text{kg}$ . The highest results were found in vicinity of where the non-contact cooling water channel makes a westward turn. Results are listed in Table 2.

***Ditch Soil Sample Results***

Ditch soil samples were collected from a total of 20 locations including the two locations where additional samples for soil moisture were collected. The soil sample was leached by the SPLP method prior to analysis. HFPO-DA results ranged from 0.12  $\mu\text{g}/\text{L}$  to 18  $\mu\text{g}/\text{L}$ . The highest results were found in the area where the ditch turns westward and crosses under the road. Results are listed in Table 3.

**FIGURES**

- |          |                                  |
|----------|----------------------------------|
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**ATTACHMENTS**

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| Attachment 2 | Laboratory Analytical Data           |

## FIGURES



**PARSONS**

PE&I  
4701 Hedgemore Dr.  
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Site Location Map  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

Drawn:  
C. Oneal  
Revision:  
1

Date:  
1/29/2018

File Project Number:  
450768

Figure Number: 1

Name: Fay\_Fig\_1\_Site\_Loc

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ED\_002011\_00000073-00006



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Wipe Sample Location Map  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

▲ Nafion® VE-South  
Wipe Sample Locations

|                    |                    |                                      |
|--------------------|--------------------|--------------------------------------|
| Drawn:<br>C. Oneal | Date:<br>3/28/2018 | File Project Number:<br>449338.01050 |
| Revision:<br>1     | Figure 2           |                                      |
| Name: VES_2        |                    |                                      |



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Surface Soil Sample Location Map  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

▲ Nafion® VE-South  
Surface Soil Locations

|              |                  |                      |
|--------------|------------------|----------------------|
| Drawn:       | Date:            | File Project Number: |
| C. Oneal     | 3/28/2018        | 449338.01050         |
| Revision:    | Figure Number: 3 |                      |
| 1            |                  |                      |
| Name: VES_3b |                  |                      |



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Ditch Soil Sample Location Map  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

|             |           |                      |
|-------------|-----------|----------------------|
| Drawn:      | Date:     | File Project Number: |
| C. Oneal    | 3/28/2018 | 449338.01050         |
| Revision:   | Figure 4  |                      |
| 1           |           |                      |
| Name: VES_1 |           |                      |

## TABLES

**Table 1**  
Wipe Sampling Results  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

| Sample ID           | Location ID | Sample Date | HFPO-DA Result<br>( $\mu\text{g}/\text{In}^2$ ) |
|---------------------|-------------|-------------|---|
| FAY-WIPE-VES-01     | 01          | 02/06/2018  | 3.21E-02  |
| FAY-WIPE-VES-02     | 02          | 02/06/2018  | 1.24E-01  |
| FAY-WIPE-VES-03     | 03          | 02/06/2018  | 5.83E-02  |
| FAY-WIPE-VES-04     | 04          | 02/06/2018  | 3.33E-03  |
| FAY-WIPE-VES-05     | 05          | 02/06/2018  | 3.26E-02  |
| FAY-WIPE-VES-06     | 06          | 02/06/2018  | 1.51E-02  |
| FAY-WIPE-VES-07     | 07          | 02/06/2018  | 1.64E-02  |
| FAY-WIPE-VES-08     | 08          | 02/06/2018  | 4.90E-03  |
| FAY-WIPE-VES-09     | 09          | 02/06/2018  | 4.24E-04  |
| FAY-WIPE-VES-10     | 10          | 02/06/2018  | 7.00E-04  |
| FAY-WIPE-VES-10-D   | 10-D        | 02/06/2018  | 7.97E-04  |
| FAY-WIPE-VES-11     | 11          | 02/06/2018  | 6.38E-03  |
| FAY-WIPE-VES-12     | 12          | 02/06/2018  | 1.61E-03  |
| FAY-WIPE-VES-13     | 13          | 02/06/2018  | 1.57E-02  |
| FAY-WIPE-VES-14     | 14          | 02/06/2018  | 2.08E-03  |
| FAY-WIPE-VES-15     | 15          | 02/06/2018  | 7.44E-03  |
| FAY-WIPE-VES-16     | 16          | 02/06/2018  | 3.80E-01  |
| FAY-WIPE-VES-17     | 17          | 02/06/2018  | 4.44E-03  |
| FAY-WIPE-VES-18     | 18          | 02/06/2018  | 6.93E-01  |
| FAY-WIPE-VES-19     | 19          | 02/07/2018  | 1.96E-01  |
| FAY-WIPE-VES-19-D   | 19-D        | 02/07/2018  | 4.71E-02  |
| FAY-WIPE-VES-20     | 20          | 02/07/2018  | 1.51E-02  |
| FAY-WIPE-VES-21     | 21          | 02/07/2018  | 7.71E-03  |
| FAY-WIPE-VES-22     | 22          | 02/07/2018  | 1.00E-01  |
| FAY-WIPE-VES-23     | 23          | 02/07/2018  | 5.86E-02  |
| FAY-WIPE-VES-A-PRE  | A-PRE       | 02/07/2018  | 4.03E-02  |
| FAY-WIPE-VES-A-POST | A-POST      | 02/13/2018  | 4.16E-03  |
| FAY-WIPE-VES-B-PRE  | B-PRE       | 02/07/2018  | 4.72E-02  |
| FAY-WIPE-VES-B-POST | B-POST      | 02/13/2018  | 2.51E-02  |

Note:

HFPO-DA = hexafluoropropylene oxide dimer acid

$\mu\text{g}/\text{In}^2$  = micrograms per square inch

D = duplicate sample

**Table 2**  
 Surface Soil Sampling Results  
 Surface Soil Sampling Investigation  
 Chemours Fayetteville Works  
 Fayetteville, North Carolina

| Sample ID         | Location ID | Sample Date | HFPO-DA Result (ug/kg) |
|-------------------|-------------|-------------|------------------------|
| FAY-SOIL-VES-01   | 01          | 2/7/2018    | 24                     |
| FAY-SOIL-VES-02   | 02          | 2/7/2018    | 3.2                    |
| FAY-SOIL-VES-02-D | 02-D        | 2/7/2018    | 3.6                    |
| FAY-SOIL-VES-03   | 03          | 2/9/2018    | 4.2                    |
| FAY-SOIL-VES-04   | 04          | 2/9/2018    | 14                     |
| FAY-SOIL-VES-05   | 05          | 2/9/2018    | 18                     |
| FAY-SOIL-VES-06   | 06          | 2/9/2018    | 24                     |
| FAY-SOIL-VES-07   | 07          | 2/9/2018    | 42                     |
| FAY-SOIL-VES-08   | 08          | 2/9/2018    | 2.9                    |
| FAY-SOIL-VES-09   | 09          | 2/9/2018    | 6.9                    |
| FAY-SOIL-VES-10   | 10          | 2/9/2018    | 110                    |
| FAY-SOIL-VES-11   | 11          | 2/9/2018    | 260                    |
| FAY-SOIL-VES-12   | 12          | 2/9/2018    | 32                     |
| FAY-SOIL-VES-13   | 13          | 2/9/2018    | 140                    |
| FAY-SOIL-VES-14   | 14          | 2/9/2018    | 130                    |
| FAY-SOIL-VES-15   | 15          | 2/9/2018    | 430                    |
| FAY-SOIL-VES-16   | 16          | 2/9/2018    | 140                    |
| FAY-SOIL-VES-17   | 17          | 2/9/2018    | 340                    |
| FAY-SOIL-VES-18   | 18          | 2/9/2018    | 220                    |
| FAY-SOIL-VES-19   | 19          | 2/9/2018    | 240                    |
| FAY-SOIL-VES-20   | 20          | 2/12/2018   | 1.8                    |
| FAY-SOIL-VES-20-D | 20-D        | 2/12/2018   | 1.8                    |
| FAY-SOIL-VES-21   | 21          | 2/12/2018   | <1.3                   |
| FAY-SOIL-VES-22   | 22          | 2/12/2018   | 2.7                    |
| FAY-SOIL-VES-23   | 23          | 2/12/2018   | 43                     |
| FAY-SOIL-VES-24   | 24          | 2/12/2018   | 14                     |
| FAY-SOIL-VES-25   | 25          | 2/13/2018   | 15                     |
| FAY-SOIL-VES-26   | 26          | 2/13/2018   | 18                     |
| FAY-SOIL-VES-27   | 27          | 2/13/2018   | 44                     |
| FAY-SOIL-VES-28   | 28          | 2/13/2018   | 140                    |
| FAY-SOIL-VES-29   | 29          | 2/13/2018   | 10                     |
| FAY-SOIL-VES-30   | 30          | 2/13/2018   | 6.2                    |
| FAY-SOIL-VES-31   | 31          | 2/13/2018   | 7.4                    |
| FAY-SOIL-VES-32   | 32          | 2/13/2018   | 2.2                    |

**Table 2**  
 Surface Soil Sampling Results  
 Surface Soil Sampling Investigation  
 Chemours Fayetteville Works  
 Fayetteville, North Carolina

| Sample ID        | Location ID | Sample Date | HFPO-DA Result (ug/kg) |
|------------------|-------------|-------------|------------------------|
| FAY-SOIL-VES-33  | 33          | 2/13/2018   | 32000                  |
| FAY-SOIL-VES-34  | 34          | 2/13/2018   | 540                    |
| FAY-SOIL-VES-35  | 35          | 2/13/2018   | 8.6                    |
| FAY-SOIL-VES-36  | 36          | 2/13/2018   | 1400                   |
| FAY-SOIL-VES-37  | 37          | 2/13/2018   | 14                     |
| FAY-SOIL-VES-38  | 38          | 2/13/2018   | 19                     |
| FAY-SOIL-VES-39  | 39          | 2/13/2018   | 130                    |
| FAY-SOIL-VES-40  | 40          | 2/21/2018   | 9.1                    |
| FAY-SOIL-VES-41  | 41          | 2/21/2018   | 29                     |
| FAY-SOIL-VES-41D | 41D         | 2/21/2018   | 110                    |
| FAY-SOIL-VES-42  | 42          | 2/21/2018   | 130                    |
| FAY-SOIL-VES-43  | 43          | 2/21/2018   | 350                    |
| FAY-SOIL-VES-44  | 44          | 2/21/2018   | 18                     |

Note:

HFPO-DA = hexafluoropropylene oxide dimer acid

ug/kg = micrograms per kilogram

D = duplicate sample

**Table 3**  
Ditch Soil Sampling Results  
Nafion® VE-South Investigation  
Chemours Fayetteville Works  
Fayetteville, North Carolina

| Sample ID       | Location ID | Sample Date | Sample Depth Interval (inches) | HFPO-DA Result (ug/L) | Moisture Result (%) |
|-----------------|-------------|-------------|--------------------------------|-----------------------|---------------------|
| FAY-DCH-VES-A   | A           | 2/8/2018    | 18-24                          | 0.14                  | NM                  |
| FAY-DCH-VES-B   | B           | 2/8/2018    | 14-20                          | 0.12                  | NM                  |
| FAY-DCH-VES-B-D | B-D         | 2/8/2018    | 14-20                          | 0.15                  | NM                  |
| FAY-DCH-VES-C-1 | C-1         | 2/8/2018    | 0-1                            | NM                    | 11.7                |
| FAY-DCH-VES-C-2 | C-2         | 2/8/2018    | 0-7                            | 0.087                 | 14.5                |
| FAY-DCH-VES-C-3 | C-3         | 2/8/2018    | 17-23                          | NM                    | 19.4                |
| FAY-DCH-VES-D   | D           | 2/8/2018    | 13-19                          | 0.42                  | NM                  |
| FAY-DCH-VES-E   | E           | 2/9/2018    | 0-9                            | 0.18                  | NM                  |
| FAY-DCH-VES-F   | F           | 2/8/2018    | 0-5                            | 0.067                 | NM                  |
| FAY-DCH-VES-G-1 | G-1         | 2/9/2018    | 0-6                            | NM                    | 10.7                |
| FAY-DCH-VES-G-2 | G-2         | 2/9/2018    | 0-6                            | NM                    | 10.2                |
| FAY-DCH-VES-G-3 | G-3         | 2/9/2018    | 0-7                            | 0.14                  | 22.2                |
| FAY-DCH-VES-H   | H           | 2/13/2018   | 0-6                            | 0.3                   | NM                  |
| FAY-DCH-VES-I   | I           | 2/13/2018   | 0-6                            | 0.69                  | NM                  |
| FAY-DCH-VES-J   | J           | 2/13/2018   | 7-13                           | 1.5                   | NM                  |
| FAY-DCH-VES-K   | K           | 2/13/2018   | 0-6                            | 18                    | NM                  |
| FAY-DCH-VES-L   | L           | 2/13/2018   | 18-24                          | 0.48                  | NM                  |
| FAY-DCH-VES-M   | M           | 2/8/2018    | 18-24                          | 0.33                  | NM                  |
| FAY-DCH-VES-N   | N           | 2/13/2018   | 0-7                            | 0.36                  | NM                  |
| FAY-DCH-VES-O   | O           | 2/9/2018    | 18-24                          | 0.65                  | NM                  |
| FAY-DCH-VES-P   | P           | 2/8/2018    | 17-22                          | 0.15                  | NM                  |

Note:

HFPO-DA = hexafluoropropylene oxide dimer acid

ug/L = micrograms per liter

NM = Not Measured

B-D = Duplicate Sample

## **ATTACHMENT 1**

**Procedure for Wipe Sample Collections**  
**Prepared by TestAmerica Laboratories, Inc. in Knoxville, TN on January 31, 2018**  
**For Chemours**

This Wipe Sampling Procedure was prepared by TestAmerica Laboratories, Inc. for use by TestAmerica customers. It is being provided to enhance the quality of wipe samples collected and sent to TestAmerica in Knoxville, Tennessee for analysis.

**1.0 Purpose/Applications**

- 1.1 Wipe samples are taken to assess the presence of contaminants on various types of hard surfaces. The major objectives for wipe or surface samples are:
  - To establish whether or not a contaminant is present.
  - To determine the level and extent of contamination.
  - To establish a database to be used for assessment of potential health risks.
  - To measure decontamination efficiencies and/or effectiveness.
- 1.2 This procedure is applicable to the collection of wipe samples to determine contamination levels on hard surfaces such as floors, walls, and equipment. Wipes are an effective means for collecting a specimen of ambient constituents deposited or settled out on surfaces as a result of some contaminant-releasing incident. **Surface areas of personnel contact or those areas associated with air handling systems are highly desirable locations to sample.** A thorough understanding of all factors contributing to the condition of contamination, possible sources and the intended use of the data must be taken into account in making appropriate decisions concerning sample location.

**2.0 Associated SOPs**

- 2.1 "Sample Collection and Documentation", Standard Operating Procedure (SOP) No. ACS-SC-0001.

**3.0 References**

- 3.1 U.S. Department of Labor, May 24, 1984, "Sampling for Surface Contamination", Industrial Hygiene Technical Manual No. 680.

**4.0 Equipment and Supplies**

- 4.1 Methanol (HPLC Grade) containing 5% NH<sub>4</sub>OH or other appropriate solvent for the specific contaminant being sampled
- 4.2 4- X 4-inch 100 percent cotton sterile gauze pads individually wrapped
- 4.3 250 mL wide-mouth HDPE bottle with solvent seal lid for solvent/pad reservoir
- 4.4 Forceps, HDPE
- 4.5 Appropriately sized sample bottles and screw caps with solvent seal lids
- 4.6 Custody tape - wide/narrow
- 4.7 Disposable gloves (appropriate to particular situation)

## **Procedure for Wipe Sample Collections (Continued)**

- 4.8 Unique preprinted sample number label tape
- 4.9 Ziploc<sup>®</sup> bag - quart and gallon sizes
- 4.10 Aluminum foil (optional for Chemours)
- 4.11 Stainless steel template or area marking device (optional for Chemours)
- 4.12 Tape measure
- 4.13 Field logbook
- 4.14 Chain-of-Custody forms
- 4.15 Request for Analysis forms
- 4.16 Sample Collection Log forms
- 4.17 Shipping containers
- 4.18 Safety glasses, ear protection, etc.

### **5.0 Procedure**

#### **5.1 Sample Location**

Sample location can be selected before arrival on site based on previous site visits, maps, etc., or immediately before collection based on observations. The following are specific goals for use of wipe sample data, which can dictate the approach used in selecting sample locations.

- 5.1.1 Worst-case contamination sample - determination of area of highest contamination probability.
- 5.1.2 Extent of contamination sample - determination of how large an area over which the contamination has been dispersed.
- 5.1.3 Post-decontamination sample - determination of any residual contamination in an area after cleanup and decontamination work has been conducted.
- 5.1.4 Toxicological assessment - determining if an area is safe from a public health and exposure standpoint.

#### **5.2 Wipe Area**

Past experience has shown that a 2,500-square-centimeter (0.25 square meters) area is appropriate for most wipe sample applications. For specific projects, the following guidelines must be addressed.

- 5.2.1 The actual area to be wiped is largely determined by available analytical method sensitivity for target parameters and the target concentration(s) that define allowable exposure levels.
- 5.2.2 Required risk assessment data may further impact the size of wipe sample areas.
- 5.2.3 If a single surface area does not provide sufficient area for sample representation, smaller areas from the same general location may be sampled and composited to form one sample for analysis.

## Procedure for Wipe Sample Collections (Continued)

### 5.3 Solvent Selection

- 5.3.1 When sampling for particulates, the wipe efficiency is improved by saturating the pad with solvent. While solubility is not the concern in this case, the presence of moisture on the wipe encourages the particulates to cling to the gauze.
- 5.3.2 When the surface is in a phase other than particulate (e.g., mist, oil layer, etc.), an appropriate solvent must be used to remove the contamination. Routinely sampled contaminant/solvent combinations are listed below:

| Contaminant                          | Solvent                             |
|--------------------------------------|-------------------------------------|
| HFPO-DA                              | Methanol/NH <sub>4</sub> OH         |
| Polychlorinated Biphenyls (PCBs)     | Hexane, Acetone, Methylene Chloride |
| Dioxins & Furans (PCDDs/PCDFs)       | Hexane                              |
| Herbicides                           | Hexane                              |
| Chlorinated Pesticides               | Hexane, Methylene Chloride          |
| Semivolatiles (BNAs)                 | Hexane, Methylene Chloride          |
| Metals & Mercury                     | 0.1N Nitric Acid Solution           |
| Chloride, Bromide, Fluoride, Sulfate | 0.5N Sodium Hydroxide Solution      |
| Cyanide                              | 0.5N Sodium Hydroxide Solution      |
| Volatiles (VOCs)                     | Methanol                            |

### 5.4 Taking the Wipe Sample

- 5.4.1 Prepare wipe collection pads by placing 4- by 4-inch, 100 percent cotton sterile gauze pads into the wide-mouth reservoir jar using gloved hands. Saturate the pads with the appropriate solvent for extraction of contaminant of interest (see Section 5.3.2 above).

**NOTE: Never place gauze pads or forceps into the solvent source. Always deliver solvent from the source container onto the gauze without contact with the supply. Irreversible contamination can result from dipping or contact with the source. By pouring the solvent on the gauze pad inside the wide mouth sample jar in which it will be placed, contact may be avoided.**

- 5.4.2 Begin the sampling procedure by collecting a field blank by wiping a pair of disposable gloves with a prepared gauze pad. The field blank will determine if specific analytical interferences may be present in either the sorbent pads, solvent, or the gloves. This procedure is repeated at a frequency of 5 percent of samples collected (1 per 20 samples), or at least once for each day that samples are collected.
- 5.4.3 Specifically locate and measure the area to be sampled and mark it with pencil or a noninterfering tape (e.g., masking tape) or utilize a premeasured, decontaminated template.

## Procedure for Wipe Sample Collections (Continued)

- 5.4.4 Don a new pair of gloves and wipe the sampling gauze pad over the designated sample area. With straight, even strokes, draw the pad across the area, slightly overlapping each stroke. Change the wiping direction **with a clean pad and repeat the pattern until confident that all of the surface contaminant has been removed.** Place all pads used to sample a single location into a common sample jar as a composite sample. A minimum of three (3) pads is recommended.
- 5.4.5 As each wipe pad is used, place it in the appropriate **prelabeled** sample container. When all pads for a sample have been completed, apply Teflon<sup>®</sup> tape around the closure area of the container.
- 5.4.6 Prepare sample documentation per "Sample Collection and Documentation", Standard Operating Procedure (SOP) No. ACS-SC-0001. Label the sample area and the location proximity, with reference points when possible.
- 5.4.7 The person in charge of field data should ensure that the following information is accurately recorded:
- Sample number on bottle and data sheet
  - Sample location (include floor number, if appropriate)
  - Sample description (e.g., wet wipe of vinyl-covered wallboard)
  - Sample date and time
  - Area sampled in square centimeters (cm<sup>2</sup>)
  - Observations/problems, if pertinent
  - Names of sampling personnel.
- 5.4.8 Upon removal of samples from site, a chain-of-custody form shall be established for the samples. The chain-of-custody will act as a transmittal form from sampling personnel to laboratory personnel and will be signed at this time to document that samples are properly relinquished and received by appropriate staff members.

### 6.0 Quality Assurance/Quality Control

- 6.1 A wipe field blank is collected at a frequency of 5 percent of samples collected (1 per 20 collected) or at least daily to verify lack of interferences or cross contamination during sample collection and handling. Collection procedure is described in Section 5.4.2.
- 6.2 Re-wipe samples may be collected to evaluate the contaminant removal efficiency from the sampled surface. Re-wipes are collected as follows:
- The exact area which has just been triple wiped is wiped again using the sample technique as for the original sample.
  - The re-wipe pads are placed in a separate sample collection jar and analyzed as a distinct sample.
  - The original and re-wipe results are used to determine the relative effectiveness of the original wipe in removing the contaminant from the surface.
  - Rewipes should be collected for every ten (10) samples, or 10% of the collections.

## **Procedure for Wipe Sample Collections (Continued)**

- 6.3 Duplicate - An area immediately adjacent to a previously sampled area is sampled using analogous techniques. Note that this is not a "true" duplicate, in the sense that it is not possible to actually split a wipe sample. There is no guarantee, therefore, that wipe duplicates will or should provide comparable results. The data may be used as a general indication of the homogeneity of the contamination across the particular surface.
- 6.4 Spikes - May be prepared in the field or laboratory. A standard solution of known concentration levels is injected onto prepared gauze pads and sent for analysis as a typical sample. Recovery efficiency, after the handling and analysis procedures, can then be assessed.

**ATTACHMENT 2  
LABORATORY ANALYTICAL DATA  
(SEE ENCLOSED CD)**